Synopsis of the Genus *Chilenoperla*

(Plecoptera: Gripopterygidae)

Charles H. Nelson[1]

Department of Biology, University of Tennessee, Chattanooga 37401

The genus *Chilenoperla* was first described by Illies (1963) in his revision of the South American Gripopterygidae and has been represented by three species all found only in Chile. Recently, while studying stonefly material from South America a new species of this genus, found both in Argentina and Chile, was discovered. Examination of relevant holotype and paratype material of the known species of *Chilenoperla* reveals that Illies mistakenly designated individuals of this undescribed species as paratypes of *Chilenoperla beschi* Illies. Hence, in order to facilitate recognition of this new species descriptions, figures and notes of the other known species of this genus have been included in this study. Unless otherwise indicated, the morphological terms utilized in the present work are those introduced by McLellan (1971) in his study of the Australian Gripopterygidae. An initial estimate of the branching relationship of the four species of this genus is also undertaken and is presented in the form of a Prim Network.

Since the identity of the females of only two species in *Chilenoperla* is known, the key below is confined to males.

KEY TO THE MALES OF CHILENOPERLA

1. Meso-posterior region of central sclerite slightly produced posteriorly (Figs. 1, 18); posterior sclerite demarked from central sclerite (Figs. 3, 19) 2
   Meso-posterior region of central sclerite moderately produced posteriorly (Figs. 6, 11); posterior sclerite not demarked from central sclerite (Figs. 8, 13) 3
2. Sub-anal lobes sharply pointed apically (Fig. 3); anterior sclerite with ventro-lateral projections (Fig. 2) ...... *C. semitincta* Illies
   Sub-anal lobes bluntly pointed apically (Fig. 19); anterior sclerite lacking ventro-lateral projections (Fig. 20) ...... *C. puerilis* Illies
3. Epiproct with less than three tooth-like projections on each side (Figs. 8, 9); posterior sclerite bifurcated apically (Fig. 6); ninth posterior sternal border broadly rounded (Fig. 7) ...... *C. beschi* Illies
   Epiproct with three or more tooth-like projections on each side (Fig. 13, 14); posterior sclerite not bifurcated apically (Fig. 11); ninth posterior sternal border with slight median emargination (Fig. 12) ...... *C. illiesi* Nelson

---

[1] Research reported in this study partially supported by a University of Chattanooga Foundation grant. Published with the aid of funds from the University of Tennessee, Chattanooga.

The Pan-Pacific Entomologist 49: 315–324. October 1973

CHILENOPERLA SEMITINCTA Illies

(Figs. 1–5)

Chilenoperla semitincta Illies, 1963, Mitt. Schweiz. Entomol. Ges. 36(3): 223–225, fig. 40; a (fore and hind wings), b (male terminalia, ventral), c (male terminalia, dorsal), d (male terminalia, lateral), e (male epiproct, lateral), f (female terminalia, ventral), g (male hind leg, lateral).

Illies, 1966, Das Tierreich, 82: 51.

Zwick, 1972, Studies on Neotrop. Fauna 7: 99.

MALE.—Brown in color with dark brown embossings on the occipital region of head and disc of pronotum. Color of each leg patterned so that proximal region of femur and most of tibia, except for basalmost region, yellow, remainder of leg brown.

MALE TERMINALIA.—Ninth sternite (fig. 2) characterized by posteriorly produced rounded subgenital plate under tenth segment.

Tenth segment (fig. 1) divided transversely by a narrow strip of membrane into anteriorly situated anterior sclerite and a posteriorly situated sclerite, here designated as mesal sclerite (ms). Anterior sclerite becoming greatly narrowed meso-dorsally and ventrally incomplete. Ventro-laterally on each side of anterior sclerite a small difficult to discern projection (fig. 2, p) arising from posteroventral margin. Roughly triangular-shaped mesal sclerite consisting of a central sclerite (cs) and two lateral sclerites (ls). Lateral sclerites situated one on each side of but undemarked from central sclerite.

Small, clearly demarked, triangular-shaped posterior sclerite (figs. 1, 3, ps) of segment eleven attached to posteroventral surface of mesal sclerite. Epiproct very broad basally but narrowing considerably apically (figs. 1, 5). When viewed laterally (figs. 3, 4) margin of each side of antero-dorsal surface bearing four to five small sharply pointed tooth-like projections. Medially, postero-ventral surface of epiproct expanded into a keel-like surface.

Cercus of each side consisting of eight segments. Dorso-basal region of basal cercal segment expanded into a roughly triangular area which extends to lateral sclerite of that side (figs. 1, 3, a).

Partly membranous and partly sclerotized sub-anal lobes (paraprocts) in lateral view (fig. 3) hook-shaped in appearance and sharply pointed at apex.

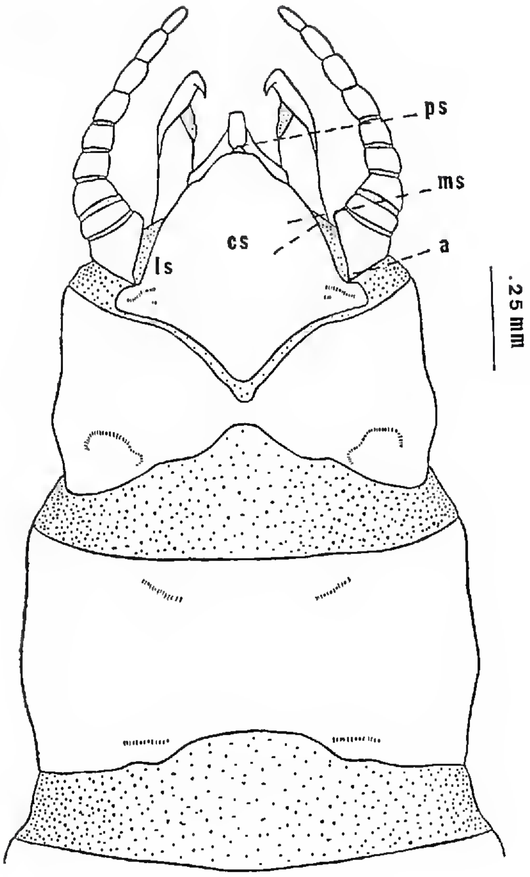
FEMALE TERMINALIA.—The female of this species was not examined during this study. However, if Illies description and figure of the female is accurate the posterior margin of the eighth sternite is slightly convex with a median emargination.

MATERIAL EXAMINED.—Holotype male, Bach bei Niebla (Kustenkordillere), Meershohe, Prov. Valdivia, Chile.

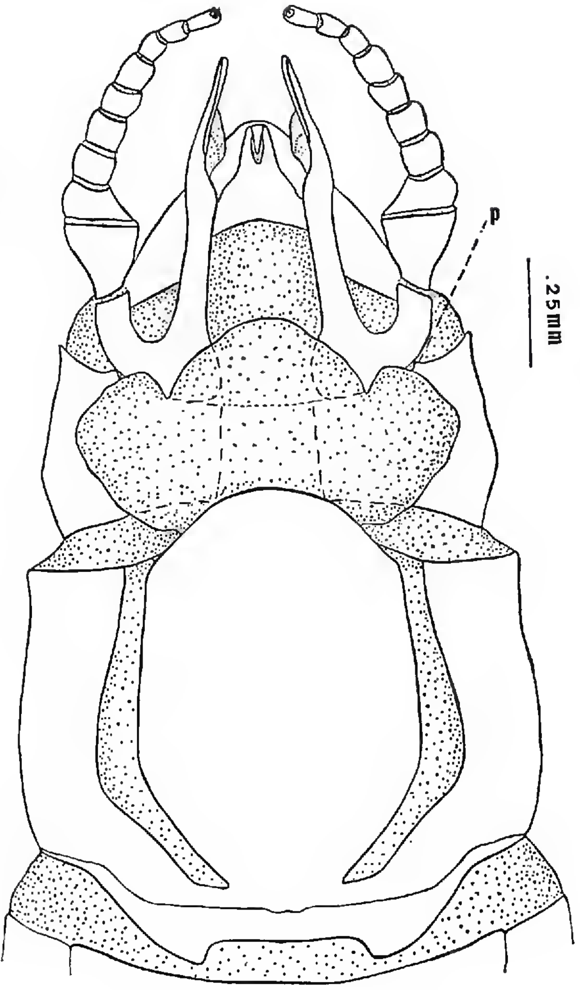
→

FIGS. 1–5 *Chilenoperla semitincta* Illies. Fig. 1. Male terminalia, dorsal view. Fig. 2. Male terminalia, ventral view. Fig. 3. Male terminalia, lateral view. Fig. 4. Male epiproct, lateral view. Fig. 5. Male epiproct, dorsal view. (ms = mesal sclerite; cs = central sclerite; ls = lateral sclerite; ps = posterior sclerite; a = dorso-basal projection of basal cercal segment; p = ventro-lateral projection of anterior sclerite).

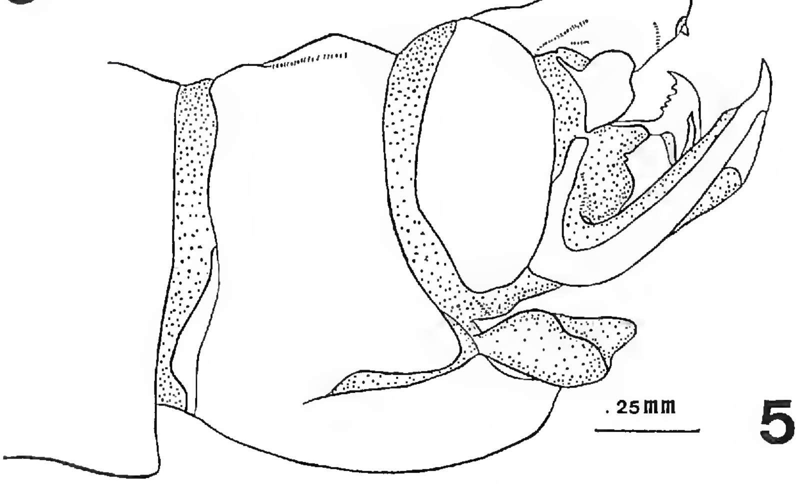
1



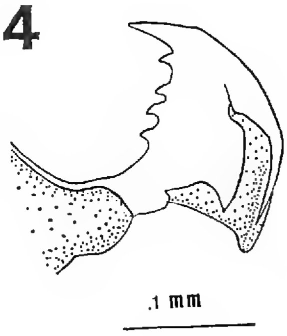
2



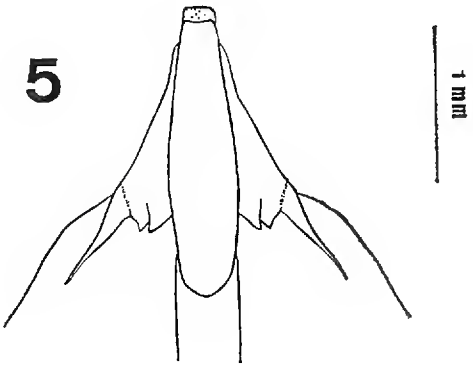
3



4



5



CHILENOPERLA BESCHI Illies
(Figs. 6–10)

Chilenoperla beschi Illies (in part), 1963, Mitt. Schweiz. Ent. Ges. 36(3): 225–226, fig. 41; a (male terminalia, ventral), b (male terminalia, dorsal), c (male terminalia, lateral), d (male epiproct, lateral).
Werner, 1965, Beitr. Neotr. Fauna, 4(3): 231.
Illies, 1966, Das Tierreich, 82: 50.

Illies (1963) described the female of *C. beschi* in his original description of this species. The identity of the female was very likely based on the single instance in the type series where males and females were simultaneously collected from the same location. Unfortunately, the males are not members of *C. beschi* but belong to a species to be described in this present study. Hence, the female previously described by Illies as *C. beschi* is most likely that of a new species of *Chilenoperla* and the identity of the female of *C. beschi* needs to be established. Werner (1965) has reported the collecting of both males and females of *C. beschi* from the same site and examination of his material may be useful in determining the identity of the female of this species.

MALE.—Color pattern similar to that of *C. semitincta* except that entire femur of each leg is uniformly brown.

MALE TERMINALIA.—Subgenital plate (fig. 7) very similar to that of *semitincta.* Anterior sclerite (fig. 6) resembling that of *C. semitincta* in being characterized by a small projection arising from the postero-ventral margin of each side. Lateral sclerites, unlike those of *C. semitincta,* clearly demarked from central sclerite. Meso-posterior region of central sclerite appearing to be longer and narrower than those of *C. semitincta* (figs. 6, 8). Posterior sclerite of *C. beschi* not clearly demarked from central sclerite. When viewed dorsally this sclerite becomes bifurcated distally with the apical margin of each half bluntly pointed. Epiproct (figs. 8, 9, 10) bears on each lateral margin of antero-dorsal surface two sharply pointed tooth-like projections. Dorso-basal region of each cercal segment (figs. 6, 8) apeparing longer and narrower in *C. beschi.* Sub-anal lobes of *C. beschi* similar to those of *C. semitincta.*

MATERIAL EXAMINED.—Holotype male, Bach bei Niebla (Kustenkordillere), Meershohe, Prov. Valdivia, Chile.

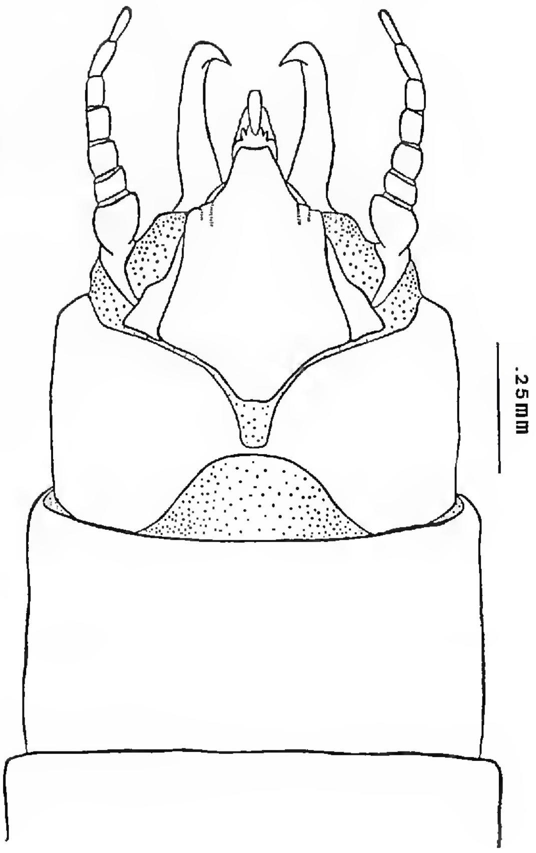
Chilenoperla illiesi Nelson, new species
(Figs. 11–17)

Chilenoperla beschi Illies (in part), 1963, Mitt. Schweiz. Ent. Ges. 36(3): 226, fig. 41; e (female terminalia, ventral).

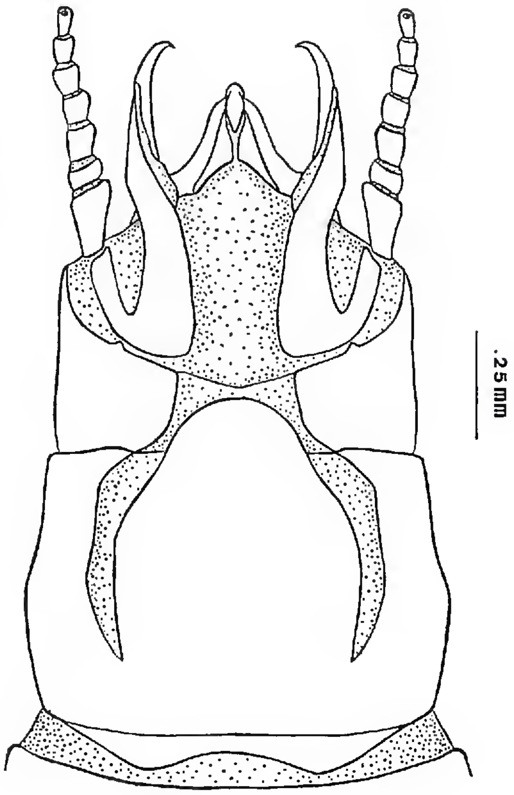
The color pattern of this species is nearly identical to that of *C. beschi.*

MALE TERMINALIA.—Posterior margin of subgenital plate (fig. 12) with a slight median emargination. Anterior sclerite of *C. illiesi,* unlike those of *C. semitincta* and *C. beschi,* ventro-laterally lacking a projection on each side. Lateral sclerites

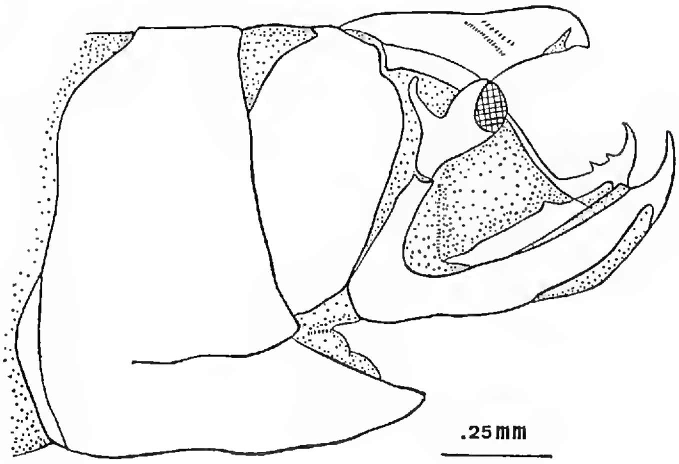
6



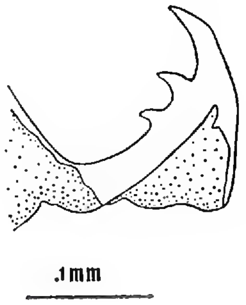
7



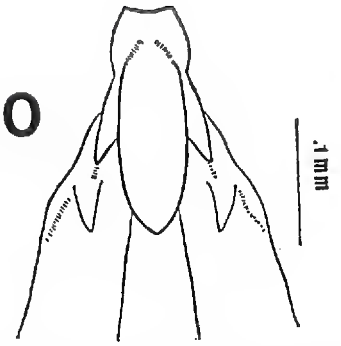
8



9

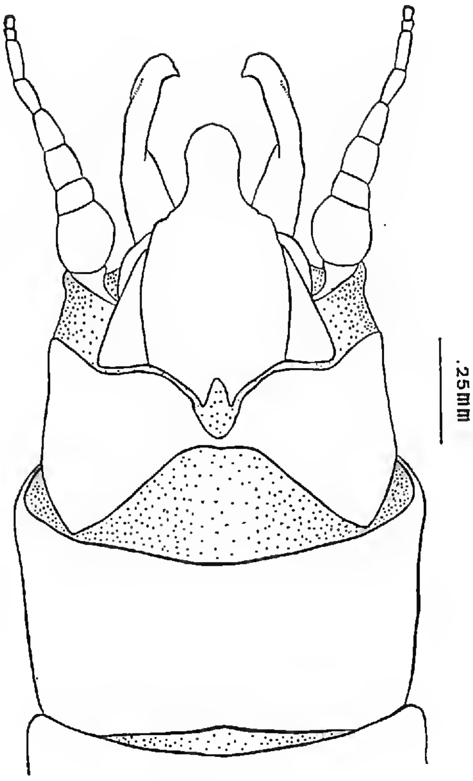


10

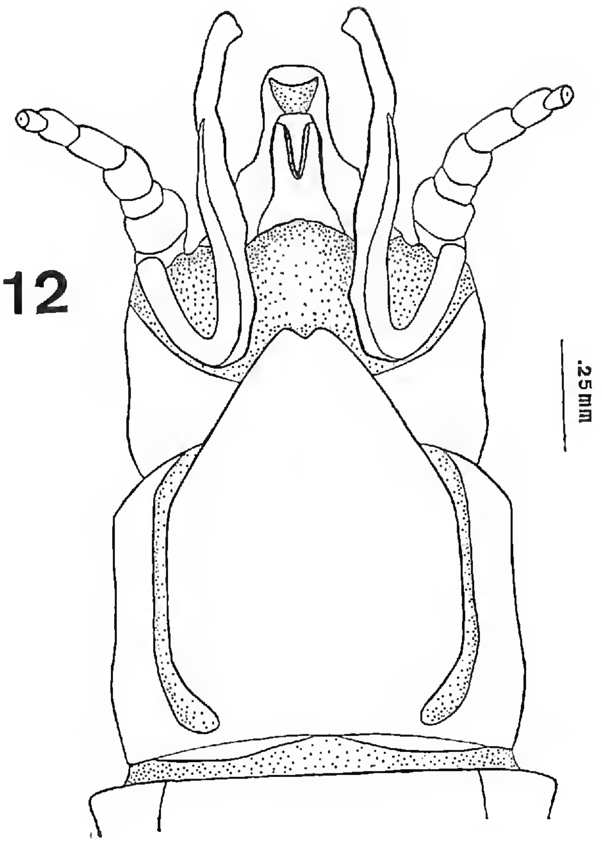


FIGS. 6–10. *Chilenoperla beschi* Illies. Fig. 6. Male terminalia, dorsal view. Fig. 7. Male terminalia, ventral view. Fig. 8. Male terminalia, lateral view. Fig. 9. Male epiproct, lateral view. Fig. 10. Male epiproct, dorsal view.

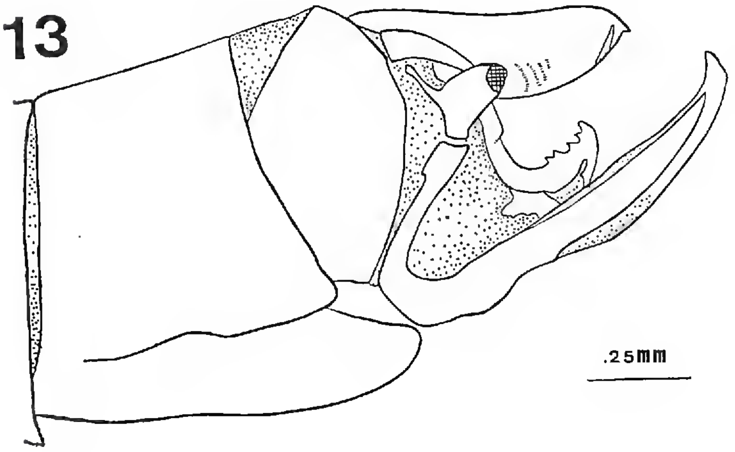
11



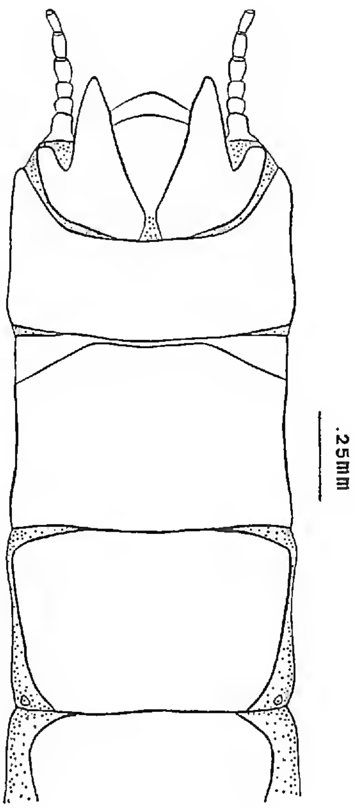
12



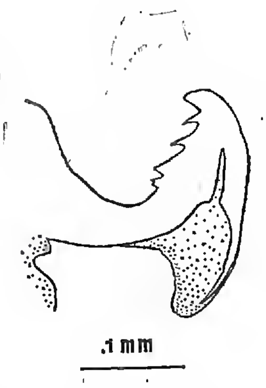
13



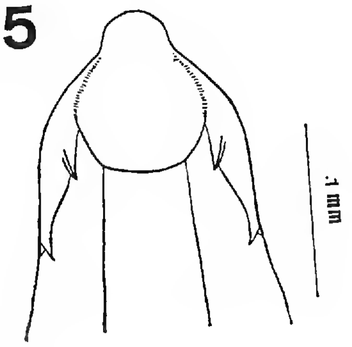
16



14



15



FIGS. 11–16. *Chilenoperla illiesi* Nelson. Fig. 11. Male terminalia, dorsal view. Fig. 12. Male terminalia, ventral view. Fig. 13. Male terminalia, lateral view. Fig. 14. Male epiproct, lateral view. Fig. 15. Male epipeoct, dorsal view. Fig. 16. Female terminalia, ventral view.

(fig. 11) clearly demarked from central sclerite. Posterior sclerite of *C. illiesi* similar to that of *C. beschi* (figs. 12, 13) in not being clearly demarked from central sclerite, but not bifurcated. Epiproct (figs. 13, 14, 15) resembling that of *C. semitincta* in having four to five small sharply pointed tooth-like projections on each margin of antero-dorsal surface. Apical portion of epiproct in dorsal view (fig. 15) broader than those of *C. semitincta* and *C. beschi.* Dorsal-basal region of each basal cercal segment (fig. 11) resembling closely that of *C. beschi.*

FEMALE TERMINALIA.—Female (fig. 16) of this species differing from that of *C. semitincta* in that posterior border of eighth sternite being bluntly rounded and lacking any median emargination.

HOLOTYPE MALE, BARILOCHE, PROV. RIO NEGRO, ARGENTINA, Nov. 1926 (R. and E. Shannon). Two males and two females, Fundo Malcho, Cordillera Parral, Prov. Linares, Chile. The holotype will be deposited in the USNM (no. 72595).

This species is named for Dr. Joachim Illies in recognition of his substantial contribution to the knowledge of the Plecoptera.

CHILENOPERLA PUERILIS Illies

(Figs. 18–22)

Chilenoperla puerilis Illies, 1963, Mitt. Schweiz. Ent. Ges. 36(3): 226–227, fig. 42; a (male terminalia, lateral), b (male epiproct, lateral).
Illies, 1966, Das Tierreich, 82: 51.

Illies (1963) description of this species is based on the male of a late instar nymph from which the genitalia of the adult could be dissected and examined. However, the determination of the relationship of this species to others in the genus is somewhat hindered in that these adult anatomical features are not completely developed.

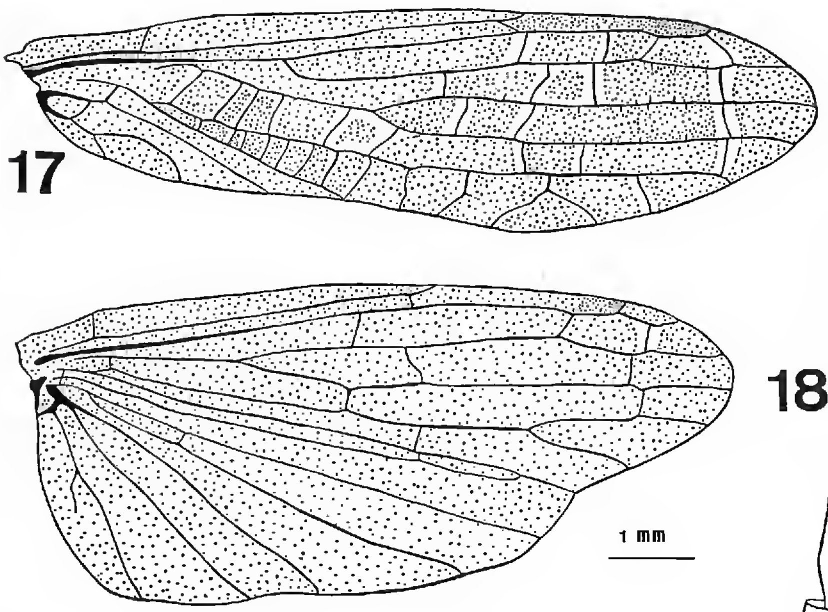
MALE TERMINALIA.—Posterior border of ninth sternite (fig. 19) broadly rounded and lacking any median emargination. Anterior sclerite of *C. puerilis* resembling that of *C. illiesi* in lacking a ventro-lateral projection on each side. Meso-posterior region of central sclerite (fig. 18) similar to that of *C. semitincta* in that it is broad and only produced slightly posteriorly. Posterior sclerite (fig. 18, 20) resembling that of *C. semitincta* in being well demarked from central sclerite and triangular in shape. Asymmetrical epiproct (figs. 19, 21, 22) with three to four small sharply pointed tooth-like projections on each margin of antero-dorsal surface. Apical extremity of sub-anal lobes (fig. 19) differing from those of the other species of this genus in being bluntly pointed.

MATERIAL EXAMINED.—Holotype male, Bach bei Laguna Margarita, Puella, Prov. Llanquihue, Chile.

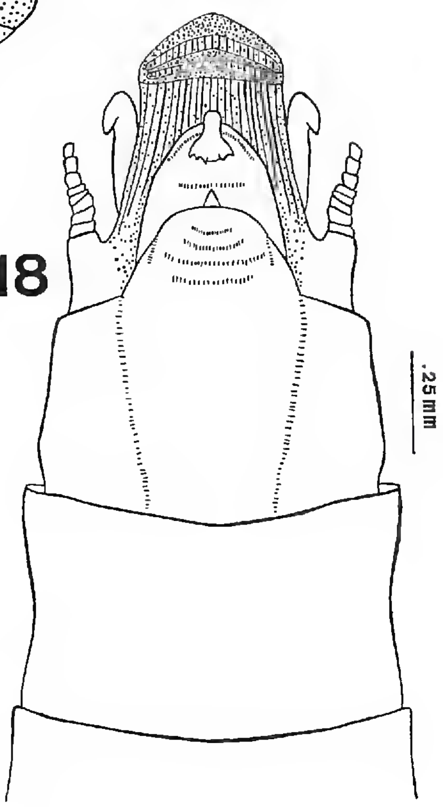
RELATIONSHIP OF THE SPECIES OF CHILENOPERLA

It is premature to construct a phylogenetic history of the species of *Chilenoperla* until more information is available concerning the various stages in the life history of both sexes of all species. However, an initial approximation, utilizing available characters, can be made in

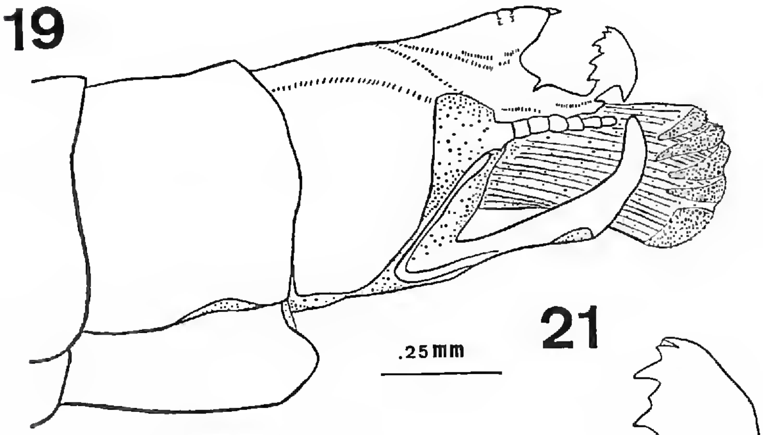
17



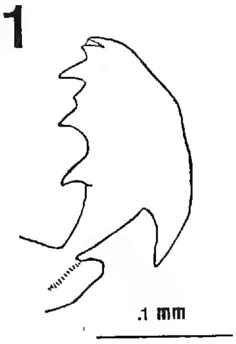
18



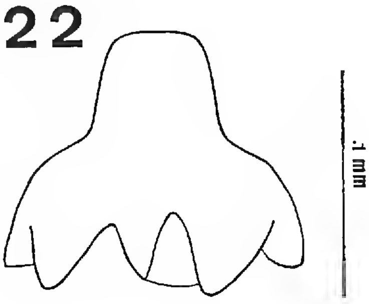
19



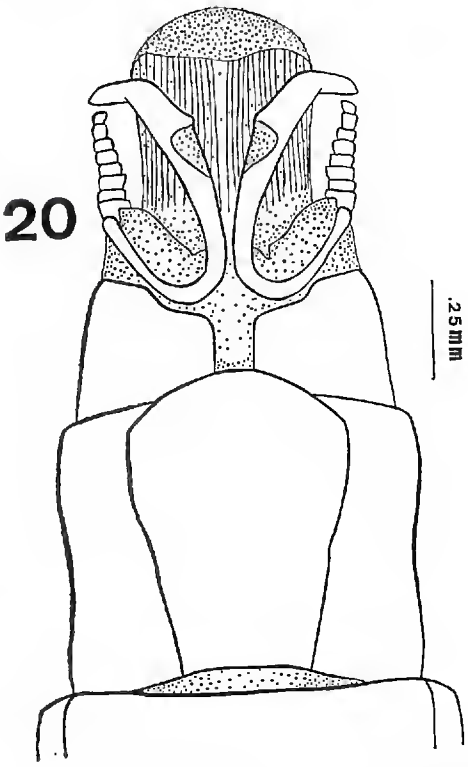
21



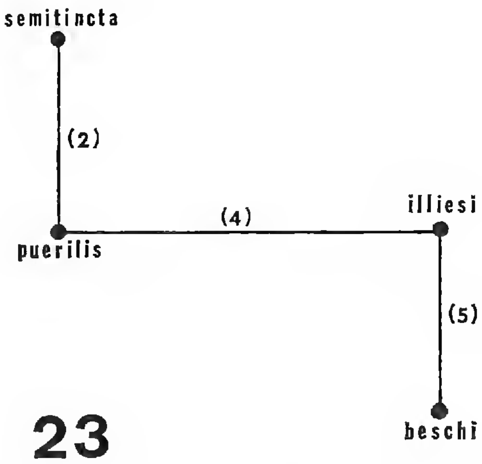
22



20



23



FIGS. 17–23. Fig. 17. *Chilenoperla illiesi* Nelson, wings. Figs. 18–22. *Chilenoperla puerilis* Illies. Fig. 18. Male terminalia, dorsal view. Fig. 19. Male terminalia, lateral view. Fig. 20. Male terminalia, ventral view. Fig. 21. Male

TABLE 1. Data Matrix consisting of the character states for the species of *Chilenoperla*. Missing character states are designated by (–).

	CHARACTERS											
SPECIES	1	2	3	4	5	6	7	8	9	10	11	12
C. semitincta	0	0	0	1	1	0	0	0	0	0	1	0
C. beschi	1	–	0	1	0	1	1	1	1	0	0	0
C. illiesi	1	1	1	0	0	1	1	0	0	1	0	0
C. puerilis	–	–	0	0	–	0	0	0	0	–	–	1

the form of a network based on phenetic differences (*sensu* Farris, 1967) between species. A network depicts only the branching relationship of the species included and requires that no judgments be made concerning the relative primitiveness or advancement of a character. In this study a Prim Network, utilizing the procedure described by Farris (1970) was constructed for the known species of *Chilenoperla*. Although, in some cases Prim Networks may not yield as reliable an estimate of branching relationships as do other quantitative cladistic techniques (e.g., Wagner Networks) they do have advantages in that they require a minimal amount of computation and do not necessarily involve the use of a computer.

The Prim Network constructed during this study (Fig. 23) indicates a close phenetic relationship between *C. semitincta* and *C. puerilis*. *Chilenoperla illiesi* is nearly equidistant from *C. puerilis* and *C. beschi* but is closer to the former species than to the latter. Analysis of the data matrix (Table 1) of the four species reveals that *C. semitincta* and *C. puerilis* have identical states for five characters (3, 6, 7, 8 and 9). *Chilenoperla illiesi* shares with *C. puerilis* identical states for three characters (4, 8 and 9) and with *C. beschi* identical states for six characters (1, 5, 6, 7, 11 and 12).

DESCRIPTIONS OF CHARACTERS.—(1) femur: monocolored = 0; bicolored = 1. (2) female eighth posterior sternal border: not emarginate = 1; emarginate = 0. (3) Male ninth posterior sternal border: not emarginate = 0; emarginate = 1. (4) Male ventro-lateral projections of anterior sclerite: absent = 0; present = 1. (5) Male lateral sclerites: demarked from central sclerite = 0; undemarked = 1.

←

epiproct, lateral view. Fig. 22. Male epiproct, dorsal view. Fig. 23. Branching relationship of the four species of *Chilenoperla* as produced from the Prim Network. The lengths of the internodes are given in parentheses.

(6) Male meso-posterior region of central sclerite: slightly produced posteriorly = 0; moderately produced posteriorly = 1. (7) Male posterior sclerite: demarked from central sclerite = 0; not demarked = 1. (8) Male posterior sclerite: not bifurcated apically = 0; bifurcated apically = 1. (9) Number of tooth-like projections on each side of male epiproct: three or greater = 0; less than three = 1. (10) Apical region of male epiproct: narrow = 0; broad = 1. (11) Dorso-basal region of male basal cercal segment: long and narrow = 0; broad and triangular-shaped = 1. (12) Sub-anal lobes: sharply pointed apically = 0; bluntly pointed apically = 1.

ACKNOWLEDGMENTS

The author would like to thank Dr. Oliver S. Flint, Jr., of the United States National Museum and Dr. Peter Zwick of the Max-Planck Limnology Institute, Schlitz, Germany for the loan of the material utilized in this study. The author would also like to thank Dr. Lane P. Lester and Dr. Gene S. Van Horn for their critical reading of the manuscript.

LITERATURE CITED

FARRIS, J. S. 1967. The meaning of relationship and taxonomic procedure. Syst. Zool., 16: 44–51.

1970. Methods for computing Wagner Trees. Syst. Zool. 19: 83–92.

ILLIES, J. 1963. Revision der sudamerikanischen Gripopterygidae. Mitt. Schweiz. Entomol. Ges., 36: 145–248.

1966. Katalog der rezenten Plecoptera. Das Tierreich. No. 82: I–XXX, 1–632.

MCLELLAN, I. D. 1971. A revision of Australian Gripopterygidae (Insecta: Plecoptera). Australian Jour. Zool., Sup. No. 2: 1–79.

WERNER, E. 1965. Beitrag zur kenntnis der Chilenischen Plecopteren. Beitr. Neotr. Fauna, 4(3): 227–233.

ZWICK, P. 1972. On *Neonemura illiesi* nov. spec. and some other stoneflies from Chile (Ins., Plecoptera). Stud. Neotrop. Fauna, 7: 95–100.

SCIENTIFIC NOTE

Synonymy in *Pampoconis* (Neuroptera, Coniopterygidae).—Meinander, 1973 (Notulae entomologicae 52: 25) described *P. dentifera,* and summarized the differences between that species, *P. latipennis,* "*P. punctipennis* Adams in litt.," and "*P. uncinata* Adams in litt." While an inadvertent error, this appears sufficient to make the last two names available nomenclatorially. *P. punctipennis* Adams, 1973, and *P. uncinata* Adams, 1973 (Pan-Pac. Entomol. 49: 250–254) are therefore synonyms of *P. punctipennis* Meinander, 1973 and *P. uncinata* Meinander, 1973, and the specimens designated as holotypes are to be regarded as lectotypes. —PHILLIP A. ADAMS, *Department of Biological Science, California State University, Fullerton, California, 92634.*